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ABSTRACT

Exotic species are organisms transported by humans, wildlife, wind, and water into regions where they did not historically exist. This ERIC Digest describes available materials and resources for teaching and learning about these exotic species. Sixteen Internet sources are provided along with six videotape resources. The digest also provides additional resource information found on CD-ROMs and curriculum packages. (MVL)

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Resources for Teaching and Learning about Exotic Species

ERIC Digest

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DIGEST
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Exotic species are organisms transported by humans, wildlife, wind, and water into regions where they did not historically exist. On the other hand, native organisms of North America are generally considered species that were ecologically established prior to the time of European settlement (Pultz, 1995). Considerable data from various scientific and commercial sources have provided convincing evidence that all U.S. shores are impacted by exotic aquatic invaders. For instance, the zebra mussel and green crab have had serious ecological and socioeconomic impacts from the Great Lakes to the Gulf of Mexico, and from the Atlantic to the Pacific oceans—and in rivers and lakes in between. According to the Aquatic Nuisance Species (ANS) Task Force (2000), Great Lakes water users spend tens of millions of dollars on zebra mussel control every year. As a result of such consequences, the National Sea Grant College Program and other organizations are very concerned with the increasing number of aquatic exotic species. The full economic and ecological impacts of each exotic species are continually under investigation.

Exotic Aquatics Control and Education

Most exotic species are both accidentally and intentionally spread by the human beings. For instance, some species can be picked up and transported on boating equipment, including trailers, motors, tackle, downriggers, anchors, axles, rollers, and centerboards. Others can be carried in the water of livewells, baitbuckets, motors, bilges, and transom wells (IISGCP, 1998). Since zebra mussels were first discovered in Lake St. Clair in June 1988, they have spread to all five of the Great Lakes and their connecting waterways, as well as inland lakes and rivers across North America, primarily through water recreation pathways.

Even though there are artificial methods to control exotic aquatics, including chemical, biological, mechanical and physical controls, educational efforts can be the most important key to solving current and future problems. If teachers and students, along with members of their communities, become more knowledgeable about exotic species, it is then possible for individuals and groups to make informed decisions about their behavior related to the introduction and spread of exotic invaders (EATM, 2000).

As Haury and Milbourne (1999) described, the Internet can provide "a way to break out of the school walls and engage students with people and resources scattered around the world." With the Internet resources described here, teachers can encourage increased student attention to aquatic invaders. Furthermore, these key information sources can be used by science communicators, parents, students, researchers, and other professionals who are making decisions about their own lifestyles.

Internet Resources

Exotic Aquatics on the Move
This site is based on a joint project of six Sea Grants and six Geographic Alliances. Geographic information (origin & distribution), educational resources, and picture collections will be very helpful in teaching and learning about exotic aquatics.
http://www.iisgcp.org/EXOTICSP/index-1.html

Aquatic Nuisance Species Task Force
The Task Force is an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species, and implementing the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. This site provides useful information related to the aquatic nuisance species task force and nonindigenous aquatic species.
http://www.anstaskforce.gov/

Invasive Species Program: the U.S. Fish and Wildlife Service
This site provides basic information and links to national strategy for management, impact on public lands, education, outreach, and control of invasive species.
http://invasives.fws.gov

Sea Grant's National Aquatic Nuisance Species Clearinghouse
This site provides North America's most extensive technical library of publications related to the spread, biology, impacts and control of zebra mussels and other important aquatic nuisance, non-indigenous and invasive species.
http://www.cce.cornell.edu/programs/nansc/nan_ld.cfm

Sea Grant Nonindigenous Species: SGNIS
This site contains a comprehensive collection of research publications and education materials produced by Sea Grant programs and other research institutions across the country about zebra mussels and other aquatic nuisance species.
http://www.sgnis.org/

Exotic Species Graphics Library: National Sea Grant Network
This library contains slides of the following exotics: zebra mussel, goby, spiny water flea, sea lamprey, ruffe, and purple loosestrife.
http://www.sgnis.org/publicat/slide/catalog1.htm

BRIDGE: Ocean Sciences Education Teacher Resource Center
This site provides educators with content-correct & content-current marine information and data. This site is designed to improve communications among educators and between the education and research communities.
http://www.vims.edu/bridge/

National Sea Grant: Nonindigenous Species Research and Outreach
This site provides nonindigenous species research proposals, Sea Grant research, and outreach efforts.
http://www.nsgo.seagrant.org/research/nonindigenous/index.html

Exotics in the Chesapeake: Maryland Sea Grant
This site explains the nature and potential impacts of nonindigenous species in the Chesapeake Bay. The Maryland Sea Grant College has produced a series of videos and fact sheets entitled "Exotics in the Chesapeake."
http://www.mdsg.umd.edu/exotics/

Exotic Species: Minnesota Sea Grant Program
This site provides general information about zebra mussels (ID card), round goby (ID card), ruffe (ID card) and purple loosestrife. The site includes a field guide to aquatic exotic plants and animals, and other educational resources for classrooms.
http://www.seagrant.umn.edu/exotics/

MIT Sea Grant Exotic Species Web Page
This exotic species site from the Massachusetts Institute of Technology (MIT) Sea Grant College Program provides an

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overview of marine bioinvaders, various links and references of exotic species, and other useful information.
http://massbay.mit.edu/exoticspecies/index.html

Aquatic Nuisance Species in Vermont
This site presents information regarding aquatic nuisance species provided by the Vermont Department of Environmental Conservation. Several species, included in this site, are water chestnut, Eurasian watermilfoil, zebra mussel, and purple loosestrife.
http://www.anr.state.vt.us/dec/waterq/ans/ans-index.htm

Aquatics Exotics News
This site presents Aquatics Exotics News provided by the Northeast Sea Grant programs on the spread of non-indigenous aquatic nuisance species. The news is also updated by the Sea Grant programs of Connecticut, Maine-New Hampshire, MIT, New York, Rhode Island, and Woods Hole.
http://www.ucc.uconn.edu/~wwwsgo/aen.html

Exotic Fish, Shell Fish, & Plants: Texas Parks and Wildlife
This site presents 'Fishing in Texas' provided by the Texas Parks and Wildlife Commission. This site also provides regulations & information on Texas state exotic, harmful, or potentially harmful fish, shellfish, or aquatic plants.
http://www.tpwd.state.tx.us/fish/infish/regulate/exotics.htm

Exotic Species and Their Effects on the Great Lakes: Great Lakes Sport Fishing Council
This site addresses the seriousness of the introduction of nonindigenous species into our ecosystem. The Council has assembled a series of informational links to help anglers learn more about the invasion of these unwanted exotics including round goby, sea lamprey, spiny water flea, zebra mussel, ruffe, and purple loosestrife.
http://www.great-lakes.org/exotics.html

Fishery Management: Great Lakes Fishery Commission
This site provides information on fish harvest, habitat, exotic species as well as various databases.
http://www.glfc.org/coord.htm

Video Resources

Zebra Mussels: Lessons Learned in the Great Lakes Region: Biology (IISG-98-4, $7.50), *Spread and Impact* (IISG-98-5, $7.50), *Control* (IISG-98-6, $7.50), *Outreach Tools* (IISG-98-7, $7.50), Complete set of four videos (IISG-98-4S, $20); **1998**; *Illinois-Indiana Sea Grant College Program*; Order: *http://www.iisgcp.org/pubs/br/vid.htm*, ph (765) 494-3573, fax (765) 496-6026

Project TELLUS: Exotic Species Video Module; LA Sea Grant College Program; Order: *http://www.laseagrant.org/index.html*, ph (225) 578-1558, Pam Blanchard (PamB@lsu.edu). Project TELLUS contains interactive video lessons for middle school students on global change issues related to the Gulf of Mexico region. The issues include biodiversity, exotic species, climatic change, water quality, and overpopulation.

Alien Ocean (UM-SG-AV-97-01, $24.95, 30 min); 1997; Maryland Sea Grant; Order: *http://www.mdsg.umd.edu/store/videos.html*, ph (301) 405-6371, fax (301) 314-9581.

Exotics in the Chesapeake: Alien Estuary (UM-SG-AV-99-01, $7.50, 12 min), *Alien River* (UM-SG-AV-99-02, $5.00, 9 min); 1999; Maryland Sea Grant; Order: *http://www.mdsg.umd.edu/store/videos.html*, ph (301) 405-6371, fax (301) 314-9581.

Aquatic Exotics (one free copy); 1996; Minnesota Department of Natural Resources; Order: ph (612) 297-1464, (612) 296-2835.

Stop Exotics Clean Your Boat ($10, 11 min); 2000; Minnesota Sea Grant; Order: *http://www.seagrant.umn.edu/exotics/stop.html*, ph (218) 726-6191.

River Invaders: The Scourge of Zebra Mussels ($24.95, 30 min); 1996; Earthwave Society; Order: ph (817) 443-0258.

Other Educational Resources

Sea Grant Nonindigenous Species (SGNIS) CD; Minnesota Sea Grant Office; Order: ph (218) 726-6191.
This CD contains materials produced by Sea Grant programs and other research institutions across the country. All research, education, and outreach information has been peer reviewed to ensure it is the highest quality scientific information available.

Zebra Mussel Information System (ZMIS) CD; the U.S. Army Corps of Engineers; Order: ph (601) 634-2972, fax (601) 634-2398
This CD provides a wide variety of information on zebra mussels. Information in the system includes identification of both adults and immatures, life history, impact, monitoring and detection, management strategies, contaminant issues as well as an extensive bibliography.

Zebra Mussel Mania Traveling Truck; IL-IN Sea Grant; Order: ph (217) 333-4780. For truck loan, Contact: Pam Blanchard [LA Sea Grant College Program, (225) 578-1558].
This education kit and curriculum offers ten activities incorporating experiments, games, stories, community action projects, and other hands-on activities to teach students in grades 3-8 about a wide range of problems associated with zebra mussels and other aquatic exotics.

Mussel Menace! Zebra Mussels and You; MN Sea Grant; Order: ph (218) 726-8712, $60.
An educator's training package for teaching groups about zebra mussels. This package contains a comprehensive guide, slide program, and a 16-minute video.

References

Aquatic Nuisance Species (ANS) Task Force. (2000). *What are aquatic nuisance species and their impacts?* Available online at http://www.anstaskforce.gov/ansimpact.htm. (September, 8, 2000)

Pultz, J. (1995). *Exotics of Lake Ontario* (New York Sea Grant Fact Sheet, December 1995). Oswego, NY: New York Sea Grant

Illinois-Indiana Sea Grant College Program (IISGCP). (1998). *Help prevent the spread of aquatic exotic plants and animals* (IL-IN-SG-98-1). Urbana, IL: Author.

Exotic Aquatics on The Move (EATM). (2000). *Exotic aquatics on the move: Project information*. Available online at http://ag.ansc.purdue.edu/EXOTICSP/project-info.htm. (September, 8, 2000)

Haury, D. L., & Milbourne, L. (1999, May). *Using the Internet to enrich science teaching and learning*. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education. An ERIC Digest [ED 433 218]

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